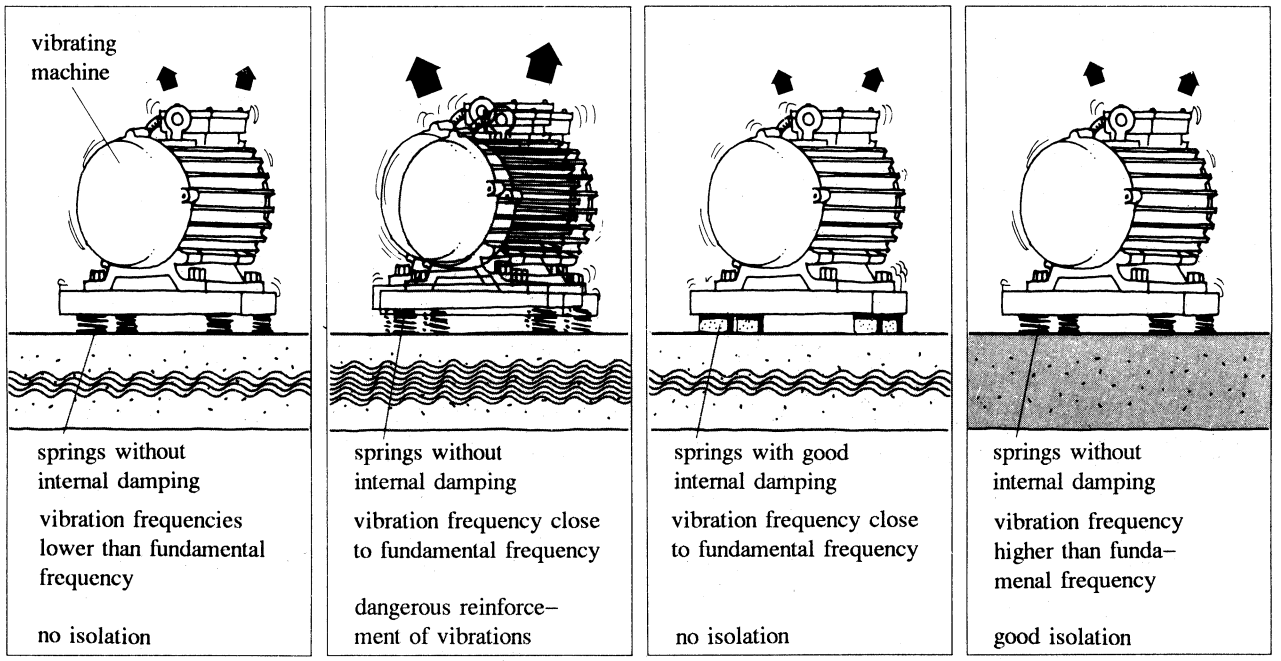
IMPROPERLY SELECTED ISOLATORS CAN INCREASE VIBRATIONS

A machine mounted on flexible elements, or isolators, has a "fundamental frequency." If the foundation is very heavy, this frequency is determined by the combined weiths of the machine and its base, and the stiffness of the isolator. The lighter the machine and the stiffer the isolator, the higher is the fundamental frequency. Vibrations at lower frequencies than the fundamental are not blocked. Vibrations at or close to the fundamental are greatly intensified. The machine may even break away from its mounting. This situation can be avoided by using elements with good internal damping.

Principle



Application to a machine that often starts and stops

Example

Two fans are used in the same building. Both are vibration isolated with steel springs which have very poor internal damping. The isolation functions well for both fans during steady operation, but one of the fans is started and stopped frequently. When this happens, the vibration frequency corresponds, for a short time, with the fundamental frequency — which produces a serious disturbance.

Control Measure

On the fan with irregular operation, the steel springs are exchanged for rubber pads with good internal damping. The isolation is somewhat less, but the disturbance from starting and stopping disappears.